The Excavating Engineer

Vol. 14 DECEMBER 1920 No. 10

Digging the Queenston-Chippewa Power Canal

The Largest Electric Shovel Operation Ever Attempted — Cars Loaded 72 Feet Above Shovel Tracks — Electric Shovels Have Offset 250% Increase in Labor Cost

WATER power, when used for generating electricity, is unquestionably one of the cheapest and most reliable sources of power. With the present high prices for fuel and labor, any means of increasing the amount of water power available for industrial use, is of more interest than ever before.

The Queenston-Chippewa Canal now under construction by the Hydro-Electric Power Commission of Ontario, Canada, will utilize at the highest possible efficiency the water power available at Niagara Falls. This development will make use of all the water power still available for Canadian use, under the international agreement between the United States and Canada.

Description of the Plant

The estimated cost of the Queenston-Chippewa Power development is $25,000,000 and 300,000 horse power will be developed.

The chief feature of this project is the canal between Chippewa, Ontario, at the mouth of the Welland River above the Falls and Queenston, Ontario, on the banks of the Niagara River just below the Royal Gorge. The route of this canal was surveyed in 1914 and work was started in May 1917.

There is a difference in elevation between Lake Erie and Lake Ontario of 330 ft. The Queenston-Chippewa Power Development will operate under a 305 ft. head. The flow of water in the canal, when the plant is operating at full capacity will be 10,000 feet per second and as stated above, the plant will develop 300,000 horse power. This gives 30 horse power for each cubic foot per second flow. The best previous hydro-electric power development produced 20 horse power for each cubic foot per second flow.

Excavation in the Welland River

The length of the canal will be 13½ miles. The Welland River is used for 4½ miles of this canal, the remaining 9 miles being excavated. The Welland River is a sluggish stream with a

The Queenston-Chippewa Power Canal, showing the canalized section of the Welland River, and excavated section of the canal from the Welland River, to the Niagara River below the Rapids.
—From Engineering News-Record.

grade of only 0.63 ft. per mile on the section to be used as part of the canal. The direction of the river is reversed from its mouth to the point where the canal branches off. The river is being deepened with a dredge and cableway excavator. The total excavation in the river is from 300,000 to 400,000 cu. yds. The total excavation necessary in the canal is about 10,000,000 cu. yds.

Canal Excavation

The first 1½ miles of canal just beyond the river is earth excavation and the remainder rock, with the exception of a short section opposite the whirlpool in the Niagara River. In the earth section the slope of the sides varies between 1¾ : 1, and 1½ : 1 with a rip rap face 5 ft. thick. In the rock section the sides are perpendicular, channelled 10 ft. down and close drilled the rest of the way. Sullivan channellers and rock drills are used. The sides will be lined with concrete to a height of 30 ft. from the bottom. The grade in the canal is 1.1 ft. per mile and the velocity of the water will be from 6 to 7 feet per second, when the plant is operating under full volume.

Choice of Excavating Machinery

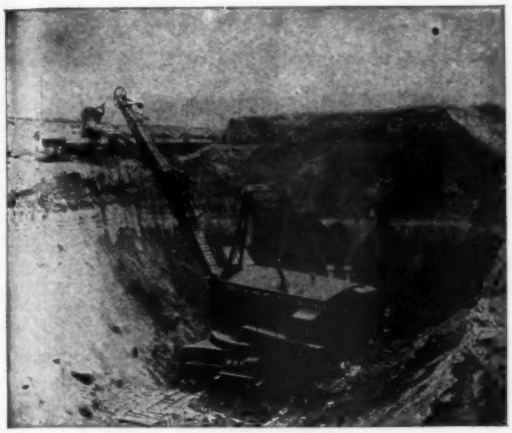
Mr. H. G. Acres, hydraulic engineer for the Hydro Electric Power Commission of Ontario, writing in the Journal of Engineering Institute of Canada, tells why the Commission decided to use large revolving shovels for most of the excavation on the Canal.

"The Commission's engineers spent several months in collecting and studying data in connection with the type of construction plant required. The operation of electric and steam driven excavating machinery was witnessed and studied in various parts of Canada and the United States and a large amount of information with reference to output, operating cost, working conditions, etc. was obtained and carefully analyzed.

The most important decision arrived at in connection with the purchase of this plant was that with reference to the use of the largest type of shovel that could be obtained. These shovels are removing the full depth of overburden while working from solid rock against a face averaging 45 feet in height, with a maximum of 80 feet. It was furthermore necessary to use these shovels in the rock cut, where they are lifting and loading into cars 65 to 70 feet above shovel grade. The rock cut, being only 48 feet wide would not permit the carrying of loading tracks down to a sufficiently low elevation to reach the loading range of an ordinary railroad shovel and it is certain that excavation by clam or drag-line would have very materially increased the cost and seriously delayed the date of completion of the rock work.

"In the earth work it was demonstrated beyond any doubt that on the bulk of the work railroad shovels would have been useless on account of the soft bottom and on some sections of the work it is doubtful if the overburden could have been removed by any possible means other than by these large shovels working from rock."

Looking North in a rock section of the canal near Station 285. (See map on page 331.) The trolley wires for the main line of the construction railway running on the ground surface can be seen in the upper left-hand corner. The loading tracks are on the rock surface at the left of the canal. In the center, one of the 225-B Bucyrus shovels is taking out the rock. Note how the top of the cut is channelled instead of drilled to prevent the surface rock from crumbling at the edge of the cut.



No. 1 225-B Bucyrus shovel at work in the deepest section of the canal. The face which the shovel is working against is over 80 feet high, and the tracks on which the cars are loaded are 72 feet above the tracks the shovel is operating on.

Operation of Large Revolving Shovels

The excavation, at the time this is written, is being done by 10 Bucyrus shovels. Most of the excavation is being done by three 225-B Bucyrus electric revolving shovels and three 103-C Bucyrus electric railroad type shovels. There are also two 18-B, one of which is electric, and one 35-B Bucyrus revolving shovels and one Class-45 Atlantic Type steam shovel.

The cuts were started by the 103-C railroad type shovels, making a pilot cut through the overburden along the canal location and loading cars on the ground surface. In the cuts made by the railroad-type shovels, the loading tracks for the big revolving shovels were run. The big shovels then dug in to the grade level of the canal and followed the pilot cut, loading into cars above. The loading tracks connect with the main line at both ends giving the shovel run-around service.

The 225-B Bucyrus revolving shovels are the largest revolving shovels ever built. They are equipped with a 90-foot boom, set at an angle of 35°, and a 58-foot dipper handle. 5 yd. to 8 yd. dippers are used, depending on the nature of the excavation. Each of these 225-B shovels weighs over 330 tons. These shovels are each equipped with two 250 H. P. hoist motors, one 150 H. P. thrust motor and one 150 H. P. swing motor.

High Outputs

These large shovels have made some very interesting excavation records. The highest output for one ten-hour shift so far was made on April 10, 1919, when No. 1 shovel, a 225-B, loaded 4930 cu. yds. At this time the shovel was loading on two tracks, one on each side, with two separate train services. The next best performance was by No. 8 225-B shovel, which removed 4770 cu. yds. on August 14th, 1919, during a 10-hour shift, loading on one track. The best monthly run was made in August 1919, by No. 8 shovel, working two 10-hour shifts for a total of 26 days. This shovel removed 175,800 cubic yards or a daily average per 10 hour shift of 3380 cubic yards. The depth of cut for all records given above was about 25 feet and the materials were clay and fine sand for No. 1 shovel and fine sand for No. 8 shovel. 20-yard Western cars were being loaded at the time these records were made.

It is hard to realize just what these outputs mean until we compare the results with hand labor. It takes an unusually good man to dig 8 cu. yds. in a day. But these Bucyrus shovels not only dig 8 cu. yds. with every load of the dipper, but raise this to the dump cars 70 feet above and return for a new load *every 50 seconds.* This is equivalent to the work of more than 600 able bodied men.

At some places on the canal the shovels have operated against a face 80 ft. high, and have loaded into cars on tracks 72 feet above the track on which the shovel operates.

An interesting feature of the operation of the electric shovels is the use of what is termed "regenerative braking" in lowering the dipper after the load has been dumped into the cars. When the operator is ready for the dipper to come down, the motors are connected with the power supply The dipper falls with the motors running at slightly above hoisting speed. This pumps power back into the line, and also saves considerable wear and tear on the shovel as the brakes are required only for stopping and holding the bucket.

This view gives a good idea of the size and reach of the big 225-B Bucyrus electric shovels, as compared to one of the Bucyrus 103-C railroad type shovels. The smaller shovel is making the first cut, in which the loading tracks for the big shovel will be run. The 225-B shovel is just starting to dig itself down to the grade level of the canal.

Electric Shovels Have Offset 250% Increase in Labor Cost

Speaking of the type of excavating machinery on this job, Mr. H. G. Acres in the same report as quoted previously, states:

"The economy of this construction plant is rather plainly indicated by the fact that in 1917, when work commenced with railroad type shovels, direct labor cost comprised 29% of the total unit cost of excavation. Today, with labor costing 250% more than in 1917, the labor cost per yard of excavation has only increased 4% over the 1917 figure of 29%. This would appear to indicate that the saving of man power resulting from the use of the large excavating units has practically off-set the 250% increase in labor expenditure. In the month just past (July) 500,000 cubic yards of earth and rock were removed and finally disposed of in 26 working days, with a total working force of 2,000 men, not more than half of whom were engaged in the direct excavating operations. These two facts alone would indicate that the type of construction plant on the Queenston-Chippewa Work has fully justified the decision which led to its adaption, and that the results being achieved would not otherwise have been possible."

The Forebay and Power House

At the power house end of the canal, the cut widens into a forebay 1000 ft. long and 300 ft. wide at the intake gate. The water reaches the turbines through steel penstocks 14 ft. in diameter and 450 ft. long. Allis Chalmers and I. P. Morris turbine units will be installed in the power house. Six 52,000 H. P. units will be installed at present and provision has been made to increase the capacity of the whole plant to more than 1,000,000 H. P.

Other Interesting Features of Construction

Several railroads cross the canal at different points and it was of course necessary to build bridges for these. These bridges were built before the canal had been excavated under them and were below the original ground level. Sheet steel piling was driven and the forms were placed. Concreting proved easy, as the mixer was set up above the bridge and the concrete chuted directly into the forms. The rock excavated from the canal is broken up and used for concrete work.

A total of more than 50 miles of construction railway is in operation on this job. Electric power is used for this railway, as on the large shovels, on account of its cheapness and convenience. The trolley wire is offset 7 ft. from the track center in order to give clearance for loading the cars and permit locomotive cranes, etc. to work. Near the middle of the canal route the railroad branches off to the dump about three miles away from the canal. Four Jordan spreader plows and one

Bucyrus 103-C Electric Shovel in Action

Bucyrus spreader plow are in use on the dump. Another Bucyrus spreader is on order.

20-yard Western dump cars, run in 8 and 10 car trains, are used for hauling the excavated material. 150 of these cars are in use here. 12 50-ton electric locomotives are used, six of these with General Electric equipment, and 6 with Westinghouse equipment.

There are over 3,000 men on the pay roll at the present time. Excavation and construction work is carried on in two 10-hour shifts, working six days a week. In the repair shops and at other places where continuous work is necessary three 8-hour shifts is the schedule.

Sir Adam Beck is chairman of the Hydro-Electric Power Commission of Ontario, which is carrying on this work under force account. Other important officials on the job are : F. A. Gaby, Chief Engineer, H. G. Acres, Hydraulic Engineer, J. B. Goodwin, Works Engineer, George Augell, General Superintendent of Construction and A. C. D. Blanchard, Chief Field Engineer.

Work is being rushed as much as possible and it is expected that the plant will be in operation in 1921.

He was driving a four-mule team hitched to a ration wagon, and he lost his way in the night and mist and drove right through the American trench line, which was not continuous at that point, and started rumbling along an old road which led across No Man's Land. He had gone a few rods when a doughboy jumped up out of a listening post and began to signal to him with both hands.

"What's the matter?" shouted the driver.

"Hush!" said the doughboy in a low and agonized whisper. "You're headed straight toward the German lines. For God's sake, turn around and don't speak above a whisper."

"Whisper, hell!" boomed the driver. "I've got to turn four mules around." —*New York Tribune.*

"Alice, when rain falls, does it ever rise again?" asked the professor in the chemistry class.

"Yes, sir."

"When?"

"Oh, in dew time." —*Burr.*

When the Hessians Camped on Broadway

How a Small Revolving Shovel Helped to Rediscover Relics of Revolutionary History, Which Have Laid Buried in New York City for 143 Years

EARLY in July 1776 a force composed largely of Hessians under the British commander, General Sir William Howe, began the siege of New York City. Washington was then in command of the American Army. Lacking artillery, ammunition and other supplies they were gradually driven northward along Manhattan Island. The superior strategy of Washington alone prevented complete envelopment and capture. In September the American army inflicted a crushing defeat on a British force some three times their number, in the battle of Harlem Heights. This was near what is now 125th St. New York City. In November of the same year Fort Washington near what is now 181st Street and Broadway, was betrayed into the hands of the enemy. The American troops were skillfully withdrawn from Manhattan Island and the Hessian troops camped in this locality.

General View of Site of Hessian Camp. 18-B Bucyrus at Work.

Fireplace of a Hessian Hut, Showing Manner of Construction

Barracks then were not what they are today. They built dugout huts with rough fireplaces made of rocks and British and Dutch brick, and they lived on what they could forage.

For seven years they lived in this spot, but up till now little was known of the exact location of what was spoken of in accounts of the time as the Musketeers Camp.

A short time ago, however, an 18-B Bucyrus shovel owned by the Spallone Contracting Company rolled up Broadway and dug in on a lot at 170th Street, and Broadway. It was making the excavation for a row of stores and a movie theatre which are to be built at this point.

It happened that an engineer, Mr. R. P. Bolton, a prominent authority on Revolutionary history, was on the job at the time. He rather suspected that the Bucyrus might uncover something of interest, as old records told of a camp that existed near a certain mile stone he had located nearby. It did. The first thing that was encountered was the old fireplace illustrated herewith, careful digging then brought to light English crockery, musket balls weighing 15 to the pound, uniform buttons and coins.

Steam shovels have uncovered curious things in the past, but it is seldom that they have been instrumental in enriching history, as this one did.

Spallone's 18-B, Bucyrus at Work on the Site of the Discoveries at 170th Street and Broadway

Difficult Side-hill Road Excavation in Colorado

All side-hill overcasting in difficult material. Description of revolving shovel operation and method of handling rock cuts.

DURANGO, COLORADO, is 40 miles from Silverton as the crow flies. At the present time, however, the only highway between these two towns is about 200 miles long.

The proposed Silverton-Durango road will be 54 miles in length, it has been under construction for more than three years, the first work being done by the State and County jointly. Later on the Bureau of Public Roads stepped in and did some work by force account and some by contract. At that time, however, the road was hardly half completed.

In the summer of 1919, the Bureau of Public Roads awarded a contract to Harry E. Fry, of Silverton, Colorado, for the completion of this road, the contract amounting to $80,000, and on August 12, Mr. Fry got busy with an up-to-date outfit, the principal unit of which being a 14-B Bucyrus revolving shovel, mounted on caterpillars.

Unusual Shovel Operation

The road runs through very rough country, following the Rio de las Animas for a part of the way past Engineers Peak.

View of Harry E. Fry's 14-B Bucyrus Revolving Shovel Engaged in County Road Work near Silverton, Colo.

The conditions under which the shovel is working are different in many respects from Highway work in any other part of the United States. All of the excavation is side-hill overcasting, none of the material being loaded into wagons or trucks.

Another View of Fry's 14-B Overcasting

The road bed when completed will be 16 ft. wide. One-fourth of this on the average consists of embankment filled in by the shovel, leaving the base of the excavation taken by the shovel 12 ft. The cut on the upper side averages about 6 ft. with a one to one slope, the excavation running about 1½ cu. yds. to the lineal foot of road. The first 6400 feet of this contract ran about 9600 cu. yds. to which should be added about 20% for borrow, making a total of 11,500 cu. yds. This excavation was done by the shovel in 82 shifts, making an average of about 140 cu. yds. per 8 hour day.

The shovel worked two shifts part of the time and three shifts of 8 hours each for the remaining time.

The material handled on this part of the contract was classified as "common" but contained about 75% loose rock running from 3 in. to 3 ft. in diameter. The greater part of this was covered with thick timber, which after being cleared, left many stumps and roots for the shovel to handle, which, of course, caused considerable delay. Much of this ground was so hard that it required blasting.

Mr. Fry also built 3600 ft. of road consisting mostly of hard granite rock. This was drilled with four Denver Clipper Drills, operated by steam from a 20 H. P. boiler mounted on wheels. This boiler carried 120 lbs. of steam. The holes were drilled 16 ft. in depth and were blasted with

T. N. T. furnished by the U. S. Government. Most of this material, after blasting, was handled by the shovel. On 1,000 ft. of this part of the work, there was 4700 cu. yds. of solid rock excavation.

Cost of Shovel Operation

The shovel was operated in shifts by one engineer at $175 a month and board, one fireman at $100 a month and board and one pitman at $4.75 per day. The average coal consumption was 1 ton per shift of 8 hours, which was delivered at the shovel with a Nash Quad Truck at a cost of $7.00 a ton. The water was piped to the shovel from the river, the average 8 hour consumption being 1200 gallons at a cost of $3.00 per shift.

The accompanying photographs offer a very good illustration of the character of the country through which the road runs. As stated, work

Taking Coal Aboard

was started on the 12th of August, 1919. On October 24th of the same year, operations had to be suspended on account of snow. Work was resumed about June 1st with the coming of spring.

Excavating Foundations for Bridge Piers with a Dragline Excavator

An interesting variation of usual methods of excavating foundation for bridge piers, successfully executed by Miami Conservancy District. Open excavation without sheet piling. A reduction in cost effected.

From the Miami Conservancy Bulletin August 1920

AN interesting variation of the usual methods used in excavating foundations for bridge piers is presented by the work on Pier No. 3 for the Black Street Bridge at Hamilton, Ohio, construction of which, as announced in the last Bulletin, has been undertaken recently by the forces of the Miami Conservancy District. The finished excavation, with the piling driven, and the first section of the forms ready, is shown in our illustration.

The pier is to be 28 by 62 feet in dimensions, of concrete, capping 150 piles spaced 3 feet apart each way. The usual plan for building such a pier is to drive a cofferdam of interlocking steel sheet piling around the pier site, bracing its walls against the external pressure, as the interior is excavated, by means of cross struts. The disadvantages of this method are the expense of the sheet steel piling, the cost of driving them, the necessity of using a clamshell, or similar bucket, of comparatively slow operation, in the actual work of excavation, and the interference of the cross bracing with both the digging and the final pile driving for the pier foundation.

Previous experience in excavating for the foundations of the wing walls which protect the abutments of the High-Main Street bridge in Hamilton, where a dragline had been substituted for clamshell, had so demonstrated the superiority of the dragline in cases where the digging is tough or difficult, that the idea suggested itself to use the dragline for the excavation of the Black Street bridge piers.

The nature of the proposed plan is clearly shown in the photograph. No sheet piling need be driven, the sides of the excavation being given the necessary slope to stand, (in this case about 2 to 1). There would be no cross bracing to get in the way of either the digging or the foundation pile driving. The excavation would be easy to get into or out of. ("You could drive a flivver into it," as one man expressed it.) And the cost of excavation alone, in spite of the fact that about three to four times the quantity of earth must be moved, would be less than in excavating a sheet piling cofferdam with a clamshell.

The experiment was tried and proved highly successful. The excavator used was a Class 14 Bucyrus, with sixty foot boom, and 1½ yard bucket. The total depth of the excavation was about 26 feet, or which the upper 10 feet was porous river gravel, below which came 4 to 8 feet of clay, followed by cemented gravel the rest of the way. This lower stratum not being a hard gravel, yet with sufficient clay to be impervious, rendered the excavation easy. Thus the strata as a whole were excellently adapted to the desired end. The bottom of the excavation being 22 to 23 feet below water level in the river, the clay and cemented gravel rendered all but a six to

Digging Foundation for Bridge Pier with a Dragline Excavator, Miami Conservancy District

seven foot thickness of the top layer tight, so that there was comparatively little seepage into the excavation; and this little was plugged to a large degree by seepage of silt into the porous layer, during a rise in the river which made the water muddy about the time the work of excavation was completed. The digging was done by the dragline bucket under water, pumping during this period being therefore unnecessary. In a week after the digging was completed, the silting up of the porous gravel had cut the water seepage into the excavation by one half.

Digging a Hydraulic Race for the Ford Tractor Company at Hamilton, Ohio

Digging a three-mile 20-foot canal and constructing a levee with a dragline excavator. In spite of unusual character of digging and poor weather and operating conditions, the contractors have averaged 1,500 cubic yards per 10-hour shift. Levee trimmed to within one foot of cross-section by dragline.

IN the middle of September, the Fred R. Jones Company of Chicago completed work on an interesting contract at Hamilton, Ohio.

The work consisted of the digging of a hydraulic race for the Hamilton and Rossville Hydraulic Company, a Ford interest, in connection with a power development scheme for the Ford Tractor plant of that city.

The contract called for the excavation of a canal, 3 miles long, running from 20 to 50 cu. yds. per lineal foot, and a levee built to standard dimensions. This canal is 22 feet wide on the bottom, 20 feet deep on the average, with 2 to 1 slopes. The levee measured 8 to 10 ft. wide on top, with an average height above the canal bottom of 35 to 38 ft.

Dragline Operation under Poor Condition

The machine used was a Class-24 Bucyrus dragline excavator with a 100-ft. boom and a 3½-cu. yd. bucket, mounted on skids and rollers. The work was done under exceedingly bad weather conditions, with poor material and with labor and supplies difficult to get. The material, furthermore, consisted of considerable muck, some gravel and much rock, as shown in the illustration.

In spite of these difficulties, the contractors succeeded in getting out between 1,200 and 1,800 cu. yds. per ten-hour shift, working double shift. This could not have been done except under the excellent superintendence and management that prevailed.

Levee Slopes Trimmed to Within One Foot of Standard Cross-Section by Dragline.

An interesting feature of the work was the manner in which the dragline trimmed the slopes of the levee. These, according to specifications, had to be built to standard dimensions and carefully dressed.

At all points the dragline trimmed these slopes to within one foot of the requisite cross-section. This was done so thoroughly by the dragline that only two men were required for the hand dressing of the levee.

The job was started in February 1920 and finished about Sept. 15th.

The work was under the direction of A. J. Kellam, Superintendent, with T. Nagle as foreman. The dragline was operated by J. Gallagher and I. Moore.

We are indebted to Mr. F. E. Welsh of the Fred R. Jones Co. for the above data.

The Fred R. Jones Company's Class-24 Bucyrus Dragline digging a 3-mile 20-foot canal and constructing a dressed levee for a hydraulic race for the Ford Tractor Company, Hamilton, Ohio. This machine averaged 1500 cu. yards per 10-hour shift under difficult operating conditions and trimmed the levee slope to within one foot of standard cross-section.

Stude: Hey, waiter, whad'ytuh call this stuff. Beef or mutton?

Waiter: Can't you tell the difference?

Stude: Naw.

Waiter: Then whatchu worryin' about? —*Sun Dial.*

Among other symptoms one might say that a man is not old till he ceases to fall in love, begins to think too much about diet, and carries a pocket thermometer to take his own temperature and a pocket mirror to examine his tongue. He shows signs of age when he begins to say that "times are changed," and to speak of young people as a separate and disappointing class. The oldest of us may always be young to someone.

—*The Dearborn Independent.*

He (putting up pictures): I can't find a single pin. Where do they all go to, anyway?

She: It's hard to tell, because they're pointed in one direction and headed in another. —*Burr.*

Making Rivet Sets That Won't Break

J. B. Ray, master smith of the Missouri Pacific at Little Rock, Ark., says the way to make rivet snaps so they will not break readily, is to use 70 or 80 or 90 percent carbon steel, heat slow all over in fire from 30 to 40 minutes, dip in cold water till perfectly cool. That makes them hard, draw them on the end, then throw them in lime and leave in there till they are cold.

—*Railway Journal*

The Excavating Engineer

A Monthly Publication Devoted to Excavating and Allied Subjects

Subscriptions, payable in advance, $1.00 a year for 12 numbers, 50 cents for six months.

To foreign countries, including postage, $1.00 a year, 6 shillings or 10 francs.

Advertising copy should reach this Office by the 10th of the month before date of issue.

THE
EXCAVATING ENGINEER PUBLISHING CO.
Bradlee Van Brunt, Manager and Editor
South Milwaukee, Wisconsin

The Large Revolving Shovel

The leading article in this issue of the Excavating Engineer, brings home in a forceful manner the rapid growth in the application of the 300-ton revolving shovel.

Like the dragline excavator, at its first conception this machine was designed for one specific purpose, and as time went on its applicability to new purposes became evident.

As is generally known, the necessity for an economical method of uncovering shallow bituminous coal veins led to the development of a revolving shovel of a much larger size than had hitherto been put on the market.

The unqualified success of this machine can be appreciated when it is known that probably one hundred 300-ton shovels are now operating in the coal fields of Illinois, Indiana, Oklahoma, Kentucky, Ohio and Pennsylvania.

The tremendous operating range of this type of shovel and its enormous capacity for sustained high outputs, rapidly led to its introduction into other fields where it has met with equal success. Perhaps the first and most natural of these new applications was the stripping and mining of iron and copper ore. As is well known, the railroad-type shovel has been used for more than a quarter-century for this purpose. One of the heaviest expenses of this open cut method, is that incident to the laying and maintenance of the loading track. The large revolving shovel not only greatly reduces this expense, but in many cases actually reduces the number of cuts necessary from nine or twelve to one. It may be seen how greatly this affects the expense of labor, truck shifting and the wear and tear on equipment and rolling stock.

Other fields have also been invaded with equal success; such as gravel plants, clay plants, and the digging of canals and large dimensions. This latter use is assisted considerably by the ease with which these machines may be converted into dragline excavators.

The great power development at Niagara Falls, however, is not only a striking illustration of the latent possibilities of the 300-ton shovel, but is undoubtedly the most impressive example on record of a gigantic undertaking with gigantic excavating units.

The Excavating Engineer Will Not Raise Rates

So much has been said in reference to the increased cost of everything that we buy, that it is hardly necessary here to remind our readers that the expense entailed in publishing a magazine, such as the Excavating Engineer, has suffered from the same malady that has been afflicting every commodity in the country.

The paper situation has been so serious that it is impossible for printers to make any definite contract with paper mills. They are neither, as a general rule, able to guarantee the quality of the paper stock, nor are they able to predict a few months ahead what the price of this paper stock will be. It is easy to see from this the problem that confronts the publishers.

We feel, however, that we owe it to ourselves to advise our readers that the Excavating Engineer has not raised its subscription rates since the magazine started publication in 1912 and it is determined not to do so for the forthcoming year, 1921. The subscription price will remain $1.00.

Advertising rates are, of course, a different matter. From time to time, in order to protect ourselves, it has been necessary, much against our will, to make a moderate increase in rates. The expense of printing the magazine alone has increased 170% since May 1917. In January 1920, it was necessary for us to issue a new rate card, applying to all advertising contracts signed after January 1st, of that year. This rate card showed an increase of less than 43% over the 1917 rates.

Although at the present time there does not seem to be any prospect of relief as far as the paper situation is concerned the Excavating Engineer, hopeful of the future, has determined to let their 1920 rates stand during the forthcoming year.

It has always been the constant effort of the editors to improve the character of the paper. There will be no slackening in these efforts during 1921 and we feel confident that our readers will find Volume 15 of the Excavating Engineer more full of information and interest than any preceding volume.

Matron: A very horried scar you have on your face, my wounded hero!

Veteran Great War: Yes, ma'am. That's what I git, ma'am, for tryin' to shave with a safety razor.—*Pelican.*

· FIELD NOTES ·

Method of Turning a Railroad-Type Shovel in a Quarry

This article was contributed by E. J. Strock, Superintendent Colorado Portland Cement Co., Portland, Colorado. It describes an interesting method of turning a railroad-type shovel end for end in a shale quarry.

At this plant it is necessary to quarry both shale and lime each day.

In working our shale quarry each cut was carried lower than the preceding one. This gave our floor a stair-steps appearance, and made it impossible to have any great width of level floor on which to turn our shovel. We expected to turn the shovel around when the cut we were then on was finished, and consequently had the rails bent but no other preparations made.

We suddenly ran into a pocket of gravel so extensive that it could not be stripped rapidly enough to allow us to continue quarrying there.

Jacking Up Front Truck

The shovel, a 70 C Bucyrus, was backed to within its length of the place where the new cut was to begin, chains were disconnected, and the rear end of the shovel jacked up.

Our rails had been bent to a curve, the radius of which was the distance between truck centers. These rails were bridled together and laid loose on ties laid at right angles to the length of the shovel, but curved in the arc of a circle. The rear truck was then swung at right angles to its usual position and lowered to the rails. The dipper hung free in front.

The rear end was then moved around the curved rails until the front truck jammed. Next the front end of the shovel was jacked up, the jack screws following closely in case a jack failed.

When clear of the rails, the front truck was swung around in the same direction as the rear was moving until the truck jammed, the short section of track fitted under the truck in its new position, the truck lowered and the rear end again pinched over. This was repeated until the shovel was facing in a direction directly opposite to its original one.

As a sample of the speed of moving, the rear end was swung around 14 feet in six minutes. The front end was jacked up and trucks swiveled to their extreme position and set on the rails in 12 minutes.

Ready to Begin

We quarried shale the morning of April 5th, and got our material ready in the afternoon, turned the shovel the morning of the 6th, and quarried shale in the new cut the afternoon of the 6th. Of course we quarried lime with the other shovel both days. Had we known in advance that the change would have had to be made, so that all material could have been ready, the job could have all been done in one day. I might mention also, that it was raining as we turned the shovel, and a cold wind was blowing.

Owen Donohue was shovel engineer.

Progress is always born in pain. Man builds his ladders from the wreckage of his father's dares. The faults and failures of one generation suggest improvements to the next. We are evolved coral insects with all past effort underlying and supporting our ever-mounting works, always leaving sounder, broader foundations upon which our children in their turn shall build. The bothers, bungles, rows and muddles now afflicting the earth are not food for pessimism, but rather cues for diagnosticians—they indicate where our systems have gone wrong. We never search for remedies until we find a pain. —*The Dearborn Independent.*

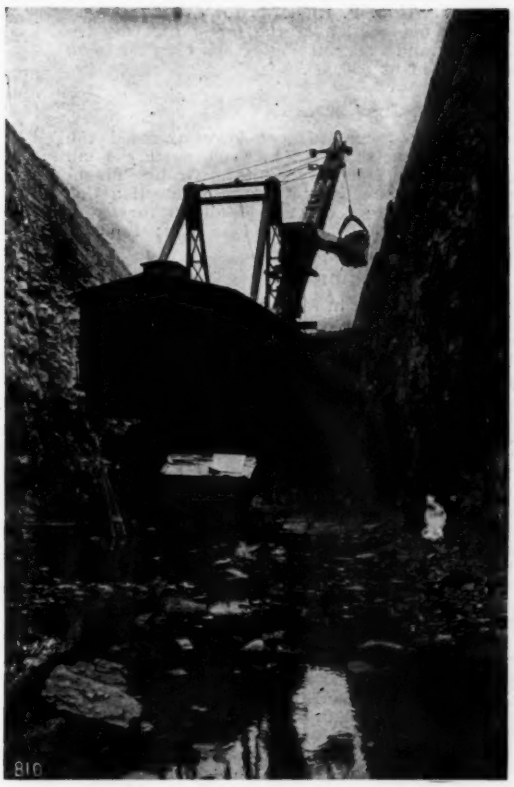
UMI

The trail left by a Bucyrus 225-B shovel going through Niagara limestone. This view shows clearly how the cut is channelled down a short distance from the top and close drilled the rest of the way. The canal will be lined with concrete.

An aeroplane view of the canal looking south at Station 240 (see map on page 331). One of the 225-B Bucyrus electric revolving shovels can be seen in action near the center of the picture, taking off the earth over-burden down to the rock. At this point in the canal a double-track electric construction railway is in operation on each side of the canal.

Four Views of the Queenston-Chippewa
Hydro-Electric Power
See page

The 5 cubic yard dipper of the 225-B getting a load. The cars in the upper left hand corner are 50 feet above the bottom of the canal. The drilling and blasting crews keep right ahead of the shovel which does not move back when the shots are fired.



A close-up of the Bucyrus 225-B shovel, shown in the view on the left, ready to dump 5 cubic yards of rock into the cars above.

Canal Now Under Construction by the
of Ontario, Canada

SHOTS FROM THE · FIRING LINE ·

Arizona

Contract awarded for Section "D," Florence-Superior highway. Federal aid No. 23, to Maurice Ryan, $143,111.-60.

Contract awarded for Holbrook-St. John highway, Federal aid No. 3, to J. P. Richards for $10,408.

Contract for one section of the forest highway between Salt River and Pleasant Valley has been let to E. H. Williams at bid of $96,000.

Arkansas

Pulaski County Commissioners have awarded the following road contracts: M. D. L. Cook, surface 5 mi. Spring Lake Highway from city limits to Granite Mountain; warrenite on stone base; Oliver Construction Co., surface 20 mi. road from Granite Mountain to county line; asphaltic concrete; total cost $983,339; Lund & Hill, Engrs.

California

Steps have been taken in formation of road construction in and around Ripley, consisting of approximately five miles. At the end of the proposed district it is expected other districts will be formed, extending south in the valley.

Bids for South Mountain road open and all rejected. County of Ventura is to do the work.

Final plans for construction of two miles extension to Foster Park roadway approved.

The bid of Rogers Bros. Company of Los Angeles, for $128,900 for road improvement was accepted.

Board of Supervisors authorized Anita M. Baldwin to build new road about two and one-half miles in length from a point on the northern shore of Fallen Leaf Lake in a northern direction to connect with the Public Highway.

Contract for the construction of 30 mi. of highway in Imperial Co. has been awarded to Peterson, Dillon & Peterson, of Calexico and Hollywood, at $750,000.

Glenn-Colusa Irrigation Dist. voted $2,587,000 bonds to purchase, improve and extend canal system of Sacramento Valley West Side Canal Co.

Twohey Brothers, of San Francisco, were awarded contract for the construction of a line from Bidwell, 1½ miles, to Bidwell Bar. The building of the line will involve the excavation of 32,000 cu. yd. of solid rock.

Canada

Canadian Pacific is constructing the following branch lines: From Rosetown, Sask., southwest a distance of 45 miles; from Milden, Sask., southwest a distance of 59 miles; from Wymark, Sask., to Archieve, a distance of 25 miles; a line 60 miles long extending east from Consul, Sask.; and a section of line extending 18 miles west from Altawan, Sask. The company also expects to begin construction this fall on a line extending a distance of 50 miles northeast from Lanigan, Sask.; a 12-mile line extending north from Russell, Man.; 25 miles of line south from Leider, Sask.; and a line from Acme, Alta., to Empress, Alta., a distance of 25 miles.

Vancouver Notes

The mayor of North Vancouver is advocating the construction of a railway connection between the Lillooet and Pemberton Meadow districts and North Vancouver.

Tenders for the construction of the new Esquimalt drydock will be returned to the Federal department of public works on December 9th, and it is expected that work will start by the end of the year.

A. W. Davis and P. J. Salvus have been awarded the contract for the building of the first six miles of the provincial highway, from Rossland to the Boundary country, and work will be commenced immediately.

Department Public Works, Ottawa, awarded Contract No. 2 on the Ballantyne pier, Burrard Inlet, to the Northern Construction Co. This contract is for the pier proper and sheds, and totals $4,500,000.

The Board of Railway Commissioners, Ottawa, have approved the plans of the proposed Johnson St. bridge, and as soon as the Marine Department have sanctioned the plans, preparations for the construction of the bridge will be made.

The construction of a permanent pier here is under consideration. Prof. Mattheson, of the University of B. C., and Mr. McIntyre, of the P.G.E., both recognized bridge experts, will be consulted and asked for suggestions on the best plan for a permanent pier, after which the engineers will proceed to find out cost of work by contract.

Hugh B. Walkem has retired from the service of the Canadian Pacific Railway, with which he has been connected for forty years, and is now resident at Haney, B.C. Mr. Walkem was born in Montreal in 1858 and has been with the C. P. R. since 1882. He was in charge of the terminal works at Vancouver and later of the locating and construction of branch lines in western Canada

John D. Isaacs, Jr., chief engineer of the Sydney E. Junkins Co., Ltd., was accidently shot and killed two weeks ago while hunting duck north of Winnipeg. Mr. Isaacs was the guest of a party of prominent men from Winnipeg, including Premier Norris. Mr. Isaacs' canoe was accidentally upset and the trigger of one of the guns caught on the edge of the boat, Mr. Isaacs being fatally wounded. He was 28 years of age and was a graduate of the University of California and a son of John D. Isaacs, consulting engineer of the Southern Pacific Railway Co., of New York. After leaving college Mr. Isaacs had several years of experience in railway construction in the United States, and about four years ago he joined the Vancouver firm and has had charge of large dock contracts which that company have carried out for the C. P. R. He has also been in charge of hydro-electric surveys and construction and at the time of death he was chief engineer for the Junkins Co. on the lining of the Connaught tunnel.

Eastern News

CANADIAN EQUIPMENT CO., MONTREAL

A modern plant costing about half a million dollars will be built on five acres of land at the corner of Hanson St. and Coxwell Ave. Toranto. Three Companies will commence operations in the plant on its completion, namely, Crouse-Hinds Co. of Canada, Harvey-Hubbell and the Hubbell-Mack Machine Screw Company.

A delegation waited upon the premier of the province, Hon. Mr. Taschereau, to ask the government for assistance in the construction of a hard-surface road from Quebec to Ste. Anne. The whole roadway will cost in the neighborhood of $300,000.

The contract for the new 90-ft. bridge across the Don River Thorncliffe, Ont. has been let to the Canadian Construction Co. at $17,000. The new structure will be of reinforced concrete. The paving of the Don Mills Rd. from the city limits to the top of the hill, will be undertaken in the early spring, according to E. A. James, Engineer.

Estimates for the proposed bridge in Toronto, over the western gap, and the tunnel which is suggested as an alternative, have been sent to the Dept. of Public Works. The cost of the bridge will be between $700,000 and $1,-

000,000 and the cost of the tunnel will be approximately $2,000,000.

The City of St. Thomas is planning the erection of a large dam with the object of increasing the City's water supply. The cost will exceed $200,000 and will increase the water supply by at least 300,000,000 gal.

A permit has been issued for the $2,000,000 addition to the Kind Edward Hotel of Toronto now under construction.

The York County Athletic Club of Toronto are planning the erection of a 14-story building at the corner of Bay and Temperance Sts., which will cost $2,811,000. The plans are now well under way.

Building permits issued in Toronto from January to October aggregate nearly $23,000,000. The value of permits issued in the month of October total $2,883,302, or $392,366 above October of last year. These figures are nearer to those of pre-war years than at any time since 1912 and 1913.

The Michigan Central Railway Co. and the Canada Iron Foundries, Limited have promised the St. Thomas Horticultural Society to construct a boulevard 35 ft. wide, with flowering shrubs and ornamental trees for a background, on nearly half a mile of land along the south side of Talbot St.

Owing to the price asked by New Toronto for a water supply to Long Branch, it is now almost a certainty that the district will go in for a water pumping plant of its own in the immediate future.

Tenders for work on the Canadian Northern Quebec Branch of the Canadian National Railways from Lachute subdivision, near Rinfret Junction, to Grenville subdivision, near Fresniere, County of Two Mountains will be received by F. P. Brady, general manager, Canadian National Railways, Bank of Toronto Bldg. Montreal, Que. until Nov. 30th, 1920. Plans and specifications may be seen at the Offices of the District Engineer, C. N. R. Que., the Resident Engineer, 411 Dorchester St. Montreal, the Division Engineer, C. N. R. Building, Ottawa, and the Chief Engineer, C. N. R. Eastern Lines, 27 Wellington St. East, Toronto.

Tenders for construction work on the Canadian Northern Quebec division, C. N. R. will be received at the office of F. P. Brady, Gen, Mgr., C. N. R. Bank of Toronto Building Montreal, Que. Specifications and plans may be seen at the offices of the District Engineer, C. N. R. Quebec, the Resident Engineer, 411 Dorchester St. Montreal, The Division Engineer C. N. R., G. N. W. Building, Ottawa, and in the office of the Chief Engineer, C. N. R. Eastern Lines, Wellington St., East Toronto.

It is reported that the United Gas and Fuel Co. intend commencing the erection of a three million dollar coke oven gas plant, on the leasehold in the Northeast end of the City of Hamilton near Stipe's inlet.

Plans for the addition to the Ritz Carlton at Montreal, are nearing completion, and is expected that tenders will be called during the winter, so that construction may be actively under way next spring. F. S. Quick is Gen. Manager of the Ritz Carlton Company. The addition will give the Hotel 150 additional rooms, it will be nine or ten stories in height and will cost approximately $750,000.

The City of St. Johns, Nfld. is to have a new 200 room hotel, costing $1,000,000 to be operated by the United Hotels Company, the capital invested to be local capital. Conferences are being held by prominent men to discuss the plans.

Near Chicoutimi, Que. it is proposed to build a line of railway through St. Felicia, about 120-miles in length. The work is contemplated to be started on this in the very near future.

Messrs. Price Bros., the big Lumber Merchants of Quebec, intend erecting a new Pulp Mill near Chicoutimi and to establish Saguenay Village to care for the workmen of the mill. This work will probably be started in the very near future.

The Electric Power Commission of New Brunswick is pushing ahead its plans for the development of water power in that Province.

At Halifax, N. S., the Nova Scotia Power Commission are taking vigorous steps to develop the water powers in Nova Scotia.

Florida

The Tampa Southern Railroad is reported to have awarded a grade contract for its proposed belt line from Gillette via Ellenton to Palmetto, nine miles, to E. C. Stover of Tampa, D. C. Gillette of Tampa, is president.

Comrs. Dade Co. voted $75,000 bonds to build 32 mi. Tamiame Trail and road to Penn Sugar Plantation, 15 ft. wide, vitr. brick or asphalt.

Idaho

Four bids by contractors for the job of constructing Federal aid project No. 44, comprising 12.14 miles of road in the Buhl highway district, Idaho-Pacific highway, were received by the State bureau of highways. The contract will in all probability be awarded to the Temple & Titus Company of Paul, whose bid was $119,001.06. Other bids were as follows: Robert Paysee, Burley, $126,419.27; Stone & Claussen, Blackfoot, $127,271.76; Heinicke Construction Company, Twin Falls, $138,894.30. All bids were for the total work with gravel surfacing in place.

Illinois

Chicago & North Western Railroad has awarded a contract to John Marsh, of Chicago, for the construction of an extension to its Heineman branch line 2½ miles in length, tapping a lumber region near Antigo, Wis. The work will cost approximately $75,000.

Inter-Mountain News

BY H. N. STEINBARGER, DENVER

Voters of Colorado passed the $5,000,000.00 Good Roads Bond Issue by a good majority, proving conclusively that Colorado people realize the necessity of good roads. This together with the assistance which will be received from the U. S. Government to the extent of like amount and the appropriation which will be made by each County receiving funds, with the bond issue will make a very satisfactory fund for construction as well as maintenance. This bond issue is very small compared to issues of other States, but nevertheless will provide the greatest amount Colorado has ever had in any one season.

Some of the Federal Aid Projects include hard surfacing, paving of highways between Greeley and Denver, Fort Collins and Denver, Colorado Springs and Denver, and a number of other sections, especially some important road projects in eastern Colorado. The only regrets of those most interested in good roads is the fact that the fund is comparatively small and that the legislature, which meets in January, must take action and make necessary provisions so the bonds can be sold, therefore it will probably be several months before funds can be realized.

There was celebrated in Denver on Nov. 10th and 11th, the return to Denver of the inspection party directed by A. L. Westgard of the American Automobile Association, after a 5590 mile tour and inspection of the Park-to Park-Highway. This is the second party that has covered the course, the first one preliminary selecting the routes, and this last, the official party, to dedicate the highways.

This all means a great deal to the entire Rocky Mountain Region, extending from just east of the Rockies to the Pacific coast, because eventually hard surfaced highways will traverse the entire section connecting all

National Parks, starting with the Rocky Mountain National Park in Colorado, Yellowstone, Glacier National Park in Montana, clear to the cost, and back through the Grand Canyon of Colorado, Mesa Verde and southwestern Colorado, thence back to Denver. A considerable amount of construction has been done throughout the mountain states, but very little hard surface highways. A number of years, of course, will be required to complete the highway, but each State, as well as the Federal Government, will do considerable work every year, until the ultimate desires of everybody concerned are realized.

"Old Timer" Dan Hallahan of the Utah Construction Co., drops in occasionally, and tells us all the news regarding the Salt Lake territory. He stopped in the other evening and had quite a chat, telling about the present figuring on the future, and a whole lot about the good old past, when things were humming in every direction. He is very optimistic over the future, and believes that big things will be started in railroad, as well as other general heavy construction in the west and very soon. Whether or not it starts very soon it goes without saying that Dan will be on the job morning, noon and night, giving the best that is in him.

Information comes to us that Bob Gleason of Hamilton & Gleason was badly injured about the first of November on their railroad work in Oregon. It seems that a bank gave away and carried him down about 35 ft. A full report of the accident is not available at this time, but it is reported that he suffered a severe scalp wound and some ribs were broken. However, as this issue goes to press he is reported to be gradually convalescing and no ill effects are expected. We certainly wish him luck and hope that he will soon be back on the job.

Will Hamilton of Hamilton & Gleason is carrying on a considerable piece of work at Soda Springs, Idaho. He has two 70-C Bucyrus and one Marion shovel on this work which consists of a new road about 12 miles in length running to the properties of the Acaconda Copper Mining Co. This job is keeping the "old soldier" pretty busy, and especially now as he is compelled to divide his time between the Soda Springs and Oregon work, until such a time as Bob Gleason can get back on the job.

Joe Flanigan, the genial superintendent of the Utah Construction Co., is running a big job at Montpeleir, Idaho, on the Oregon Short Line. It consists of widening cuts and enlarging the yards. Things are always on the hum when Joe is on the job.

It is rumored that the C. B. & Q. may do a lot of double tracking between Hastings, Nebr., and Denver, in the future. Just how soon in the future is not known.

Pat Fahey is sure making the dirt fly on the Utah Construction job on the Union Pacific double tracking work from Evanston, Wyo., west. He now has 10 shovels and four draglines on the job, all going at top speed and cutting a swath in the face of the earth that you can see for miles. When this double tracking is in service it will surely relieve the congestion on the Union Pacific. This work is being carried on under extreme difficulties, owing to the fact that there is almost a train in every block day and night, either freight or passenger, the former, of course, predominating. However, you can leave it to Pat to overcome such difficulties and keep things going.

It is rumored that the Union Pacific may lay some double tracking between Emery, Utah and Gateway, Utah, sometime next spring. This will be near Devils Slide, Utah, and the work has been contemplated for a long time, as it is quite necessary to the service and speed up policy of the Union Pacific Railroad.

Some day it is believed that the Union Pacific will lay tracks for a new line from Medicine Bow, Wyo., to Gering, Nebr., and it is possible that a branch may be run to Casper. This will serve as an outlet for a rich section of the country, and of course will make a great cut-off for the Union Pacific. Here is hoping that it goes forward in the near future.

A great example of civic as well as State pride was exhibited by the citizens of Idaho Springs, Colo., when they got out on three different occasions and worked on the road that will form the connecting link between Idaho Springs and the New Mount Evans highway. Several hundred residents including many women on the different occasions spent a full day on the road.

Idaho Springs claims the honor of starting the community road building in Colorado, when at one time, several years ago, they worked on Floyd Hill, reducing the grade about 50%. It is proposed to make a community road building a permanent plan and it is expected that one day of every month during the summer season will be given to much needed work, which in most cases will be in the nature of emergency work. The principal heavy construction of course will be done by contract or force account by the State and Federal Government.

The San Isabel National Forest section is coming into its own, due largely to the interest of the Federal Government Officials, in the establishment of highways, trails and tourist hotels and lodges. It is expected that about $200,000 will be expended by the Government in co-operation with private interests. The forest embraces 651,000 acres and extends along the Sangre de Christo range and the Greenhorn range of mountains in the southwestern part of the State and is one of the most beautiful spots in the country. It is reported that plans are under way for the construction of two large hotels in the forest reserve, one located near Beulah, Colo., and the other near Westcliffe, Colo. It is expected that actual construction will start in the spring.

Several important highway projects were completed during the last few weeks in the State of Colorado. The Durango-Silverton highway, which eliminates the necessity of shipping automobiles, trucks and other vehicles by rail between these points is perhaps the most important one from an economic standpoint. It was the only point in the 1,000 mile circle trip connecting Denver with the western slope that had no highway connection. The cost of the work was approximately $550,000 part of it being constructed by the U. S. Bureau of Roads by force account who worked on the Durango end, using a Marion shovel, and the balance by Harry E. Frey, who constructed the Silverton end using his 14B Bucyrus shovel. Approximately 400,000 TNT was used in blasting; a 19 mile section of this highway being blasted from solid rock. The important towns that this highway conects are Morrison, Shawnee, Fairplay, Buena Vista, Salida, Monarch Pass, Montrose, Silverton, Durango, Pagosa Springs, Wolf Creek Pass, Monte Vista, Alamosa, La Veta, Walsenburg, Pueblo and Colorado Springs.

Another important piece of work on this 1,000 mile circle trip recently completed was a cut through solid rock on Monarch Pass which will eliminate an 80 mile detour.

There was also completed a short time ago a so-called Fall River road which will open up an avenue of travel from Estes Park, Rocky Mountain National Park and the Grand Lake, in Colorado. This was completed after four years of work and it was most difficult due to the fact that the elevation ranges from 10,000 to 12,000 feet above sea level, and the work could be conducted only a few months each year owing to the heavy storms and deep snows. This will not only open up a rich country but will furnish a trip through one of the most beautiful sections of the United States., and eventually will be a part of a circle trip of some three or four hundred miles, which, when completed, will prove a great source of pleasure for the thousands of tourists from all over the United States who visit this section of Colorado every year.

The contract has just been let for the construction of six and one-half miles of surfaced road, extending east

and west from Craig. The road is known as Colorado Federal Aid project No. 74. The contract was awarded to the Northwestern Construction Company of Craig. The six and one-half mile stretch will cost in the neighborhood of $69,000.

Proposed Colorado highways to cost $210,000 have been approved by the local U. S. Bureau of Roads, and recommendations forwarded to Washington. Construction will begin this fall.

Iowa

Cass Co. let the contract building 7 mi. drainage project in Bear Creek and Noble Twps., involving 388,000 cu. yd. excav., to Callahan-Walker Constr. Co., 222 Bee Bldg., Omaha, Neb. About $81,000.

Massachusetts

Mr. Antone Gracia, 118 Potomska Street, New Bedford, is operating a 14-B Bucyrus shovel, excavating for water mains for the City of New Bedford. He is making wonderful progress and is establishing a record for himself and the Bucyrus shovel.

Michigan

Bd. Rd. Comrs. Missaukee Co. let contract grading, draining and surfacing 5.406 mi. of State Trunk Line Rd. 55-2, Sect. B, 16 ft. wide, to C. L. Simon and P. J. Theisen, Big Rapids, $48,958.

Missouri

McWilliams Dredging Co., Chicago, Ill., low bidder for 1,500,000 cubic yards of ditch work about St. Joseph at 25 cents per cubic yard, and clearing at 20 cents per square yard.

State Highway Dept., Jefferson City, plans to build 8.5 mi. Alexandria-Wayland Rd. (Wayland Special Rd. Dist.), Clark Co., involving 34,000 cu. yd. earth excav., 62,022 sq. yd. gravel pavement, 15 culverts, cost $81,261; 1.75 mi. Keokuk-Wayland Rd. (Wayland Special Rd. Dist.), Clark Co., 9,000 cu. yd. earth excav., 16,521 sq. yd. gravel pavement, 3 culverts, one 30 ft. concrete bridge, $35,410; 4 mi. Jefferson Highway (Blue Star Special Rd. Dist.), Barton Co., 4,848 cu. yd. earth excav., 28,160 sq. yd. Joplin chats pavement, 8 in. deep, 12 ft. wide, 2 culverts, extensions to 5 old culverts, one 30 ft. rein-con. bridge, $16,000; 7 mi. Carthage-Springfield Rd. (Avilia Special Rd. Dist.) Jasper Co., 22,765 cu. yd. earth excav., 42,280 sq. yd. gravel surfacing, 7 culverts, extensions to 14 old culverts, $29,400; 6 mi. Carthage-Springfield Rd. (Carthage Special Rd. Dist.) 100 cu. yd. rock excav., 36,240 sq. yd. gravel pavement, 5 in. deep, 12 ft. wide, 7 culverts, extensions to 10 old culverts, $31,200; 13.5 mi. Kings Highway, Pemiscot Co., 26,500 cu. yd. earth excav., 26 culverts, one 70 ft. and one 55 ft. steel, two 35 ft., one 25 ft. and one 40 ft. concrete bridges, $43,089; 22 mi. Cape Girardeau-Springfield Rd., Bollinger Co., 100,000 cu. yd. excav. 10 per cent rock, 77,440 sq. yd. gravel pavement, 70 culverts, one 300 ft. concrete, one 150 ft. and one 60 ft. steel bridges, $154,455.

Montana

New irrigation district to cover from 20,000 to 30,000 acres of land to be created.

Surveys for a new road to take the place of the Priest's Pass road over the main mountain range is being made.

B. P. Melchert of Lewistown, with a bid of $72,076 was awarded the contract for project No. 48. The job is for twenty-five miles of roadway between Baker and Ekalaka in Fallon county. The estimate was $75,304.

J. E. Hilton was awarded the contract for No. 86, on his bid of $110,646. The project is for seventeen miles of road work and a small bridge in Fallon county on the Yellowstone trail. The estimate was $124,297.

During the year 1920 and until October 20th the State Highway Commission has placed under construction agreement 71 projects in 32 counties, representing 560 miles of road and 26 bridges, at a total price of $5,505,245.41. The road improvements include the following: Earth or roadside material grading projects 174.7 miles; gravel and macadam surfacing projects, 354.6 miles; Bituminous concrete pavement 1.37 miles; Portland cement concrete pavement 29.37 miles.

Nebraska

S. C. Johnson is operating a Bucyrus dragline in Bridgeport, for the U. S. Reclamation Service.

Nevada

The State Highway Department has awarded a contract for the construction of a section of State highway in Washoe County between Bowers' Mansion and Lakeview, to W. J. Schmidt, Reno.

New Mexico

Contract awarded to A. T. Young for Federal aid No. 34-B, Rio Arriba county, on bid of $95,991.

New York

New York State Highway Department have purchased the old quarry property of the Semet Solvay Co. at Split Rock. This lies about 15 miles west of Syracuse, and was the source of the Solvay Co.'s rock before they developed the big quarry at Jamesville, south of Syracuse on the line of the D. L. & W. & R. R. It is rumored that the State Highway Dept. intends to install crushers, etc. and get out their own stone for the repairs and building of roads in Central New York.

John Young, Syracuse contractor was low bidder at $258,550.56 for 4580 ft. of 9 ft. sewer work to extend the main intercepting sewer in Syracuse. Work has not been officially awarded as yet, but as Mr. Young's bid was so much lower than the next one, there is no doubt but that he will secure the work.

The Lane Construction Co. Meriden, Conn. were low bidders on New York State road contracts No. 1545, No. 1546 and No. 5661, the two former being in Oneida and the latter in Yates County. They total 13.53 miles. This concern has just completed the resurfacing of the state road from Fulton to Three River Point. They have also taken about $90,000.00 worth of paving in the city of Fulton. The Lane Co. has long been known in Connecicut and southern Mass. as road builders and quarry operators.

Richard Hopkins of Troy, was low bidder on state road contract No. 5656, in Montgomery County.

S. B. Van Wagonen was low bidder on State road contract No. 1419, in Ulster County. Mr. Van Wagonen lives at Rondout, which is now part of the city of Kingston.

The above bids were opened at Albany on Oct. 29th.

The Du Pont interest have taken over the mill on the River road, at Buffalo that was started by the Philadelphia Rubber Co. and whose construction was stopped some time ago. After changing the plans somewhat the Du Pont Co. are completing the mill and intend to manufacture fibre silk there.

Kimberly Clark Co. Neenah, Wis. are building a paper mill at Niagara Falls. They have also secured an immense tract of pulp wood in Canada and are proceeding with the construction of a mill there.

Donner Steel Co. Buffalo, have taken bids on a dock and extension to their blast furnace plant at North Tonawanda. Contracts for the excavation and walls have not been let yet, but it is expected that they will be announced any day.

New York Central is accepting bids for the construction of a Subway under its tracks at Brown St., Rochester, to cost approximately $500,000.

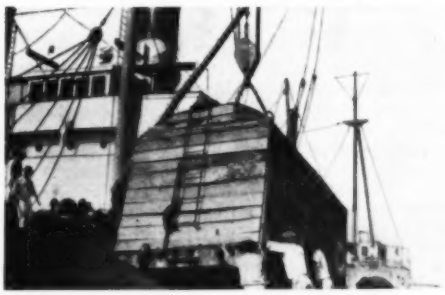
The firm of Brown & Lowe & Law Bro. have been awarded the contract from the State, for laying the foundation of a large grain elevator, that the State is erecting on the Barge Canal property at Oswego.

Equipment has moved to the place but active work will probably not start before spring.

New York City

BY G. H. HUTCHINSON

Mr. Al Geddes breezed into New York, looking like a newly elected Republican headed for the White House, and completed the story of his recent achievment by transporting a Marion Model 31 steam shovel from Copley, Ohio to Tanamo, Cuba in sixteen days. This feat was performed with the aid of the Erie Railroad, "The Atlantic



Taking Shovel Out of Hold by Ship's Tackle and Lowering on Trucks

Fruit Company's" S/S "Gendolla" and American push. The chief pusher being Mr. Geddes.

The shovel left New York, August 26th on the S/S "Gendolla" and arrived at Tanamo, September 2nd. seven A. M. Unloading was started at eight A. M. on the same date. The shovel was transported with very little knocking down and was erected on the deck of a lighter about a mile from shore. The lighter was towed to the beach where a cribbing was constructed and the shovel moved from the lighter to the shore under its own power. On September 3d, the shovel was moved to a railroad cut distance about one mile and arrived ready for action at eleven A. M. Mr. Geddes was under a contract to deliver shovel in Cuba in three weeks. By doing so, it was agreed

Shovel Landed on a Lighter a Mile from Shore

that Mr. Geddes was to receive a certain amount as salary and expense and in addition a very nice bonus. We assume from the fact that he had time to spare, that he brought back the bonus which accounts for his very prosperous appearance. Geddes informs us he was so busy making sure of the bonus that he forgot to take a drink while in Cuba.

Mr. Geddes states he is ready to contract to deliver small revolving shovels to any of the West Indies or South America by steamer, without knocking down, other than is necessary to transport them by rail. This should effect a considerable saving in time and money over the present method.

The new 14-B Bucyrus shovel recently purchased by Thomas Grimmins Contracting Company, 624 Madison Avenue, this City, is busily engaged under the able direction of Mr. James Fallon, in excavating almost solid rock, between 29th and 30th Streets, on Broadway. Excellent progress is being made. Mr. Fallon has stated in his opinion, there are no other machines of this size in the country that would have handled the excavation without shooting and complete the job within a specified time. There is no doubt but what the "bright lights" of Broadway have had some influence on the performance of Mr. Fallon and the 14-B.

The Thomas Crimmins Company have established a record for tackling difficult propositions and getting away with them, and are willing to move their 14-B Bucyrus on any job that other makes of shovels have laid down on.

North Carolina

State Highway Comn., div. office, Greensboro, let contract improving 9.64 mi., Federal Aid Project 101B, 18 ft. wide, Randolph Co., and 21.82 mi. road between Pittsboro and Chatham-Randolph Co. line, 18 ft. wide, Chatham Co., to J. T. Pott, Greensboro, $62,560 and $125,380, respectively; 5 mi. road from Sparta to Glade Creek, Federal Aid Project 125A, 12 ft. wide, Alleghany Co., to W. E. Graham, Mt. Ulla, $139,510; 11.93 mi. road from Virginia State line to Yanceyville, Federal Aid Project 112, 18 ft. wide. Caswell Co., to J. M. Gregory & Co., Laurens, S. C., $63,300.

The State Highway Commission had plans prepared for 12.5 miles of road between Leechville and point north of Swann Quarter, Federal Aid Project 88. The road is to be 30 ft. wide, involving 6,410 cu. yd. common excavation, 160,750 cu. yd. of borrow (or dredging), at cost of $160,000; also road running from Swann, north to connect with above mentioned road, Federal Aid Project 87. This road is also 30 ft. wide, involving 137,644 cu. yd. earth borrow. Cost $130,000 U. S. Fallis, State Highway Engineer.

North Dakota

Comrs. Mountrail Co. let contract building 12 mi. Federal Aid Project 75, to Stanley Bros., Grand Forks. The Work involves 119,246 cu. yd. excav., at $.60 per cu. yd., 9,335 cu. yd. overhaul, $.10, etc., total cost, about $90,000.

Northern States News

Voters of Minnesota passed the Babcock Good Roads Amendment on November 2nd to the entire satisfaction of the many road contractors in this locality. It is hoped that the improved conditions of the railroads will continue and that the numerous embargoes on the shipment of road materials that have caused so much curtailing of road work during the past year will not prevail in 1921.

Mr. Mark J. Woodhull of The Bucyrus Co. spent several days on the Range last month renewing his many acquaintances made during his stay there last winter. He regretted not finding the new Oliver Hotel in operation. He reports that the Chow palaces of Hibbing are quite as bad as ever and discovered that one of the leading restaurants buys their gravy by the barrel.

Two new Class-50 Bucyrus spreader plows have been installed on the Mesabo Range during the past month. One is being used by the M. A. Hanna Company at their

Leonard mine near Hibbing, and one is employed by Butler Brothers at the Bovey-Judd Mine near Taconite.

When this is printed the Lake Superior iron region will have completed their 1920 ore shipping season. This region has just completed sending forward to the furnaces its first billion ton of iron ore. The record for the season of 1920 will be in the neighborhood of fifty-six million tons.

The City of Hibbing, Minnesota, has let contract for 21,000 square yards of Warrenite- bitulithic pavement, to the General Contracting Company of Minneapolis, Minn.

Commissioners of Minnehaha County, South Dakota, have let contract for graveling six miles of West 12th Street road out of Huron, South Dakota, to L. E. Gage Construction Company, Huron, South Dakota; and eleven miles of the Garretson road to W. R. Larson, Sioux Falls, S. Dakota.

Yellow Medicine County, Minnesota, received bids on November 23rd for the construction of County Ditch No. 9. This work comprises approximately thirty miles of open work including about 1.500 yds. of excavation.

Bids are asked by the County Auditor of Itasca County for the construction of the subgrade, including ditches, culverts and bridge on State Road No. 9, comprising a length of 7.75 miles involving 166,000 cu. yds. of excavation. Bids for this work will be received at Grand Rapids, Minnesota, on December 7th.

Dawson & Swanson Company of Hibbing have been awarded contract for the construction of a road five miles long on the east side of Cass Lake.

The City of Minneapolis contemplate expending approximately $600,000 for sewer construction next year. The work will be done by day labor.

Scott Co. let the contract for building 7 mi. Minn. Federal Aid Project 93, State Rd. 9, involving 6 acres clearing, 4 acres grubbing, 181,000 cu. yd. excav., 418,-000 cu. yd. overhaul, 11,500 cu. yd. gravel surfacing, etc., to J. Cox, 567 Gilfillian Bldg., St. Paul, $102,448.

Contract for the construction of 5 mi. Minn. Federal Aid Project No. 199, between Le Sueur and Cleveland, awarded by the Comrs. of Le Sueur Co. to Nolan Bros., Minneapolis, at $46,000.

Ohio

Mr. Sam James is operating the Bedford Silicia Sand Company's 14-B shovel at Bedford, and is much pleased with the operation of this machine, particularly the caterpillar. Mr. S. Curren is Superintendent of the quarry in which this machine is operating.

Secretary of Agriculture Washington, D. C. approved the Ohio Road building project which will allow $80,000 more of Federal Aid money to be used by the Buckeye state to aid in the construction of permanent highway; Ohio projects approved follow: Cleveland-Wooster Road between Seville and Medina in Medina County, $45,600; Cleveland-Wooster Road between Seville and Creston in Medina County at $36,120.

Oregon

The Grant's Pass-Crescent Road is to be constructed, $800,000 is available for the projects. It is also proposed to improve the coastal road in Cold Beach in Del Norte County.

Notes from the Pacific Coast

BY L. T. RUSSELL AND C. W. WHITNEY

Boss & Hampshire have just completed their Highway work on the Yakima River near Ellensberg, Washington, and have sold one of their two 18-B Bucyrus Shovels they were using at that point to the Kerry Timber Co. of Kerry, Oregon. Mr. Boss informs us that owing to bad weather and also to numerous slides they will not complete their work on the Camas Valley-Remote Road in Southern Oregon until pretty well in the next summer.

Work on the Railroad out from Buxton, Oregon, which is under contract to the Utah Construction Co., has been held up temporarily owing to very rainy weather.

Eugene Pruner an old time shovel runner was a visitor at Portland, recently.

Ed Thomas who has been running an 18-B Bucyrus Shovel almost continuously for three years on the work of Boss & Hampshire was a recent visitor to Portland. Ed states that he rather likes the idea of staying in civilization this winter.

Steam Shovel work in general has slowed down considerably in the last two months, and there will probably be little doing in this line before next March or April when Highway work again becomes active. There is great interest being taken throughout the Northwest in Irrigation and Drainage work, and it is expected that some good contracts will be let shortly after the first of the year.

Business conditions are decidedly quiet in Seattle and vicinity, more to we believe than any place on the Pacific Coast.

The Union Rock Company of Los Angeles report an excellent business, and they have just purchased a Bucyrus 30-B Shovel to use in their rock quarry near Hollywood.

J. A. Hill is still busy digging large basements, and Barney Cairns is his right-hand man when it comes to digging.

The writer wishes to acknowledge a pleasant visit last month with Mr. George Myers, Superintendent of Pit Mining for the Phelps-Dodge Corporation at Bisbee, Arizona. Mr. Myers advises us they are working six shovels on the day shift and five at night.

James Ryan, shovel runner at Bisbee, still wears the same genial grin, and is also somewhat of a stayer, in that he has been at Bisbee continuously since shovel work started about three years ago.

We learn from Mr. Myers, Superintendent, more details concerning the death of James Curtin, steam shovel foreman at Bisbee. It appears Mr. Curtin was suddenly taken ill while on a trip to Douglas and, after being taken to the hospital, was operated upon but died of peritonites within twenty-four hours from the first attack.

Mr. George Foley, who was formerly in charge of shovels at Santa Rita, New Mexico, has succeeded James Curtin at Bisbee as steam-shovel foreman under the general direction of Mr. George Myers, Superintendent.

The writer acknowledges a pleasant visit with Mr. E. E. Vanderhoef, Superintendent of open-pit mining at Jerome, Arizona. Mr. Vanderhoef is using two Osgood 120 shovels and one Marion 300 in his work. One of the shovels being on high-grade copper ore.

Lee Oliver is back again at Bisbee running an 88-Bucyrus shovel after an absence of more than a year.

The writer met and had a pleasant visit with Harry Sweet, now working at Bisbee. Harry is an old time shovel runner and well acquainted in both San Francisco and Los Angeles districts.

James Farrell, one of our best known shovel engineers in the Northwest has moved to California with his family and is engaged with Chadwick & Sykes, San Francisco, overhauling a Vulcan shovel. His son, J. A. Farrell is also working for Chadwick & Sykes, So. San Francisco, on a 45-ton Bucyrus. A second Farrell, Jr., is also employed in San Francisco.

The Ross Construction Company was low bidder for reconstruction of the marine railway near San Diego, by the Navy Dept. Their figure was $207,000.00.

The Board of Directors of the Langell Valley Irrigation District Oregon, has awarded to Thomas Lynch of Klamath Falls, Oregon, the contract for their irrigation

project. Water will be taken from Clear Lake and 9,000 of the 25,000 acres of the District will be irrigated under the above contract. The present work involves $225,000.

Irving L. Ryder has been appointed County Engineer of Santa Clara Co., California, and will have supervision of all road work to be carried on in the future by the County.

The Granite Rock Company, of Watsonville, has been awarded a contract for grading and macadamizing the Santa Ana and township roads in San Benito Co.

A. J. Fairbanks, Willitis, California, has a contract for construction of three miles of Graton-Occidental Highway, Sonoma Co.

United Dredging Company, Los Angeles, has been awarded a contract by the Navy Department, for $545,-670.00, to cover the dredging of about 2,700,000 cu. yds. in San Diego harbor. This Company was also low bidder on dredging work in Oakland Harbor, involving about 2,-000,000 cu. yds. their bid being approximately 13c and 14c per cu. yd. for the two sections of the work.

Willitt & Burr, San Francisco, have been awarded a contract by the U. S. Bureau of Public Roads for the construction of 8.7 miles of Klamath River Road, National Forest Project, Siskiyou Co. Their bid was $150,-116.00 and the work involves probably 124,000 yards of excavation.

Palmer & Peterson have been awarded the contract by the Pitt River Power Company, to do the preliminary work on the first of the two large dams to be built on the Pitt River near Redding, Calif. This dam is to be 200 ft. high and 80,000 HP will be developed. The work also involves digging a diversion tunnel 500 ft. long, 20 ft. wide, and 17 ft. high. The work is to be in charge of Richard Huggard, and will be carried on under the supervision of Mr. Feusier, Engineer in charge.

The Western Pacific Railroad Company has awarded a contract to the Utah Construction Company of San Francisco, for grading and construction of culverts on the Company's branch road which is being built from San Jose to Niles. This is the first of the branches that the Western Pacific R. R. Company is planning to build in California.

City Engineer, T. D. Klikenny, Vallejo, California, is preparing plans for the Gordon Valley Water Project, at a total estimated cost of $1,000,000.00. The work involves an earth fill dam, 12 mile pipe line and installation of pumping plant.

Robert Mackay & Co., Tucson, Ariz. has been awarded the contract for 6 miles of the Arivaca road which is part of the Pima County Highway System. The work involves 32,000 cu. yds. of excavation.

A true index of the growth of California is to be found in the annual report of the railroad commission for the fiscal year ending June 30, 1920. The report, which, has just been forwarded to Governor William D. Stephens, shows that in the period covered the commission authorized the issuance of securities totaling 91,038,485.12.

Pennsylvania

The Pennsylvania State Highway Department has announced that during the week ending Oct. 14, all records of road construction in that state were broken. During that week 26.27 mi. of pavement were laid on various construction projects.

During the present construction season the State Highway Department has contracted for approximately 230 mi. of paved highways. The maintenance forces of the department have resurfaced approximately 315 mi. of macadam roadway and have oiled 1,300 mi. of highways.

Pittsburgh and Vicinity

F. A. RUMBARGER

The John F. Casey Company and the Pennsylvania Railroad are making every effort to remove a large slide along the Bigelow Boulevard and are using a King's Model Barnhart steam shovel, Class 45 Atlantic, 70-C Bucyrus, 60-C Bucyrus, 70 Marion, 76 Marion, 60 Marion, 61 Marion four Erie B shovels and four 21-ton clam shell McMyler cranes. This slide has shut off the Bigelow Boulevard which is the main outlet of automobile traffic to the East End of the City, and if the slide keeps moving, the Pennsylvania Railroad will be completely cut off from entering Union Station from the East.

Jack Ryan formerly General Superintendent of the Isabella Mining Company is now with the John F. Casey Company on the big slide.

The Clinton Block Coal Company have started their 225-B stripping at Imperial, Pa.

Samuel Gamble Company, Carnegie, Pa. have about five miles of State Road Work between Mars and Evans City, Pa. This work has progressed very nicely considering the amount of delays in getting sand and crushed stone to the operation. The Gamble Company are using the latest modern machinery for the work. About two miles of the work has been completed. For excavating they used a 14-B Bucyrus traction wheel mounted shovel.

W. H. Ferguson, Contractor at McDonald who had a sub from the Ferguson-Edmondson Company on their Pennsylvania Railroad job at Dennison, Ohio informs us that his part of the work is completed.

P. Doyle, G. S. of the Harmon Creek Coal Company operations at Burgettstown and Hopedale, Ohio states their Company is now ready for their winter run.

M. C. Perkins, Treasurer of the Federal Gas Coal Company was a business caller in Pittsburgh this month.

C. P. Mayer, President of the C. P. Mayer Brick Company, Bridgeville, Pa. who in addition to manufacturing brick has been operating very successfully a modern coal stripping operation at Bridgeville has recently gone into a new line, that is the Airplane business. Charlie has formed a Company at Bridgeville and is hauling passengers over the city at various intervals. He has two Planes now in daily use.

The White Clay Mining Company at Bridgeville, Pa. who were operating a Marion 300 and 36 have completed the work there and are moving the 300 to their other operations.

Southern States News

BY C. N. BALLENTINE AND E. J. WILKE, BIRMINGHAM, ALA.

In company with Mr. George B. Massey; of George B. Massey Company, Chicago, Ill., the writers had the pleasure of inspecting the U. S. Dredge "Herrod" with Capt. Nedroy. Capt. Nedroy has been connected with the dredging work on the Mississippi river for the past thirty years, and has recently had his dredge near Memphis, Tennessee on harbor work.

Mr. W. H. Darragh, the steam shovel engineer, is now on a trip to the Pacific Coast.

Mr. J. W. Williams, who has been operating shovels in this section, is now located at Florence, Mississippi. Any communications for him should be addressed to R. F. D. No. 3, Box 35, Florence, Mississippi.

Mr. G. G. Benefield, who has been connected with some of the large contractors in the South during the past fifteen years, is now at his home in Kenner, Louisiana.

Mr. C. L. Flournoy, Jasper, Texas, who installed a caterpillar shovel early in the year for road work, has purchased another machine for some new work which he has in view.

McWilliams Company, Inc., Memphis, Tennessee, were successful bidders on the work recently let in the Laban Bayou Drainage District.

W. H. Raidart, who for a number of years had charge of one of the levee building machines in the Fourth District, M. R. C., is now located at 5452 Delmar Blvd. St. Louis, Missouri.

Rood Construction Company, Wisconsin Rapids,

Wisconsin, were successful bidders on the work recently let in the Christmas Drainage District.

The Board of Supervisors, Adams County, Natchez, Miss., at a meeting held recently decided to postpone indefinitely the purchase of equipment for the work in Adams County.

The Hall Construction Co. Atlanta, Ga. have a years contract for stripping overburden from phosphate near Mulberry, Florida, for the International Agricultural Corporation. Mr. C. N. Brown is engineer on the 70-C shovel being used on this work.

N. E. Sutton is engineer on the 80-C shovel being operated by E. W. Parker near Pierce, Florida. This shovel is stripping overburden from a phosphate deposit for the American Agricultural Corporation. Harry Touchton is cranesman.

National Cement Co. Ragland, Ala. will remodel their plant to double their monthly capacity of 20,000 barrels.

W. Z. Williams Co. have started work on their contract with the International Agricultural Corporation, to strip overburden from phosphate deposits. They are using Marion steam shovels on the work.

The Alabama Power Company have made application to the power commission at Washington for approval of their plans to construct a new power dam on the Coosa River. This plant is needed to supply additional power to take care of the increased demand for power. They expect to have the new dam completed and working by January 1st 1923.

The Atlantic Coast Line Railway are reported to have commenced work on the extension from Moore Haven to Immokalee, Florida.

J. A. Jones is operating a steam shovel at Wilson Dam No. 2. His address is P. O. Box 786, East Florence, Ala.

Tennessee

Big South Fork Ry. Co. is building 14-mi. line from connection with Oneida & Western Ry. along Big South Fork of Cumberland River to Kentucky State line. Easy river grade. Contrs., Costello Bros. Co.; sub-contrs., Cohen Construction Co. Rails received. Cumberland Coal & Coke Co., owner. J. A. Reid, Gen. Mgr. and Supt., Oneida, Tenn.; residence, Dayton, O., W. B. Crenshaw, Ch. Engr.

The Big South Fork Ry. is building a 14-mile line from the connection with the Oneida & Western Ry. along Big South Fork of Cumberland river to the Kentucky state line. Contract awarded.

P. S. Needham is operating a 14-B Bucyrus shovel for Geo. W. Turner Co., contractors of So. Memphis. The work being done is leveling a hill to provide yard space for the Goodlander-Robertson Mills. It is estimated that the job involves 30,000 cu. yds. of earth excavation. Needham's address is Station G, c/o J. R. Stone, So. Memphis.

Texas

Frank Kell and associates of the Wichita Falls awarded the contract for the extension of the Wichita Falls & Southern Railway from Newcastle to Graham, then southwest near the town of South Bend through Eliasville and thence into Stephens County.

Falls Co. let contract for the grading, surfacing and draining 6.78 mi. of Highway 2 through Precinct 1, 17 ft. wide.

Atascosa Co. let the contract for grading, surfacing and draining 13.47 mi. of Highway 9 from Pleasanton to Bexar Co., 16 ft. wide, to W. T. Montgomery, Alamo Bank Bldg., San Antonio, $187,639. Works involves 26.8 acres clearing and grubbing, 55,183 cu. yd. earth borrow excav., 31,610 cu. yd. gravel, 523.2 cu. yd. Class "A" and 93.8 cu. yd. Class "B" concrete.

Lamar Co. let contracts for (1) improving 27.7 mi. Highway from Flannin Co. to Red River involving 7.82 acres clearing and grubbing, 3,250 cu. yd. ditching and 173,177 cu. yd. borrow, (2) 22.16 mi. Highway 19 from Delto Co. to Oklahoma state line, 29.6 acres clearing and grubbing, 1,850 cu. yd. ditching, 165,066 cu. yd. borrow excav., etc. to Smith Bros. and Healey Constr. Co. c/o Smith Bros., Crockett, (1) $61,144, (2) $68,718, both including 10% for engineering and contingencies.

Aransas Co. received bids Oct. 8, improving 9.51 mi. Rockport-Aransas Rd., 16 ft. wide, (a) 9.515 mi. reshaping shoulders, surfacing, hauling and placing 23,168 cu. yd. mud shell, (b) furnishing mud shell, from Heidenfels Bros., Rockport, (b) 16,086; Aransas Shell Constr. Co., Aransas Pass, (a) $49,380; Miller Constr. Co., Port Lavaca, (a) $51,500.

Texas, Oklahoma & Eastern Ry. company is constructing a line from Broken Bow, Okla., to De Queen, Ark., a distance of 25 miles, at a cost of approximately $600,000, which will permit the company to operate its line from Valliant, Okla., to Dierks, Ark., a distance of 76 miles, by January 15, 1921.

Morris Co. are having plans prepared for grading, surfacing and building concrete culverts and timber trestle on 2.694 mi. Highway 35, from Boggy Creek to Titus Co. line, involving 9,498 cu. yd. borrow and 13,504 cu. yd. earth excav. Mc.Lendon & Purnell, co.

Bexar Co. are having plans prepared for surfacing and draining 5.1 mi. Highway 27—Bandera—Proposed Project 217, involving 4.65 mi. road grader work, 3,600 cu. yd. borrow, 4,480 cu. yd. earth, 1,280 cu. yd. loose rock and 640 cu. yd. solid rock excav. About $61,193. C. E. Hoff, San Antonio, co. engr.

San Augustine Co. are having plans prepared for grading, surfacing and draining 20.9 mi. Highway 21, from Nacogdoches Co. line to Sabine Co. line involving 37,800 cu. yd. borrow, 189,000 cu. yd. unclassified earth and 2,000 cu. yd. solid rock excav. About $296,540. W. A. French, co. engr.

Johnson County Commrs.; construct 41 mi. gravel roads; $97,000; contract for 23 mi. to O'Connor & Gilkinson, Dallas,; 8 mi. to Allhands & Davis, Rogers, Ark., and 10 mi. to Williams & Scarborough, Cleburne,; R. O. Whitaker, County Engr., Cleburne.

Utah

The Amalgamated Sugar Co. is back of plans for the creation of a new drainage district to cover 60,000 to 100,000 acres of land in the Cache valley.

Plans laid for the consolidation of Hyrum and Paradise Irrigation Companies to secure the erection of a large reservoir to irrigate 2000 acres in South Cache valley.

Plans before County Commissioners providing for the creation of a new irrigation district at the north end of Tooele valley.

Contract for grading the Price-Castle Gate highway is awarded to the Strange-Valandingham Company at bid of $138,288.31.

Washington

The county commissioners recently granted petitions of residents on Eureka flat to pave fifty-five miles of road running from Walla Walla to Prescott, with branches to Clyde and Eureka. The roads will be paved under the Donohue road plan. The cost will be over $500,000 for the improvement.

City Engineering Department is preparing plans for a project which involves the dredging of two hundred thousand cubic yards of material, proposed site of Pier A slips at Smith Cove, and the sluicing of this material into that portion of Elliott Avenue. Estimated cost of project $150,000.

Wyoming

Ferry & Anderson of Encampment were awarded the contract for the construction of the four-mile section of the Encampment-Saratoga road in Carbon county by the State Highway Commission.

Foreign

South America

The government of Ecuador has authoried a concession for the construction of a railway to connect the Pacific Ocean with the Amazon river, serving the Republic of Ecuador, Colombia and Venezuela on the north, and Peru, Bolivia and Brazil on the south. The route planned runs from Port Bolivia on the Pacific to Port Borza on the Amazon. The railway will serve the best petroleum-bearing districts in Peru and also afford means of connecting the four Provinces of Southern Ecuador with the rest of that country.

A railway line to cost $250,000 is to be constructed between Sao Luiz and Caxias in the state of Maranhao, Brazil, for which it is estimated that 3,500 tons of rails and 77 tons of fish plate will be needed.

A plant for the treatment of national coal for use on the Central of Brazil Railway is to be installed at Cachoeira, state of Sao Paulo, at a cost of $375,000.

The Chilean Ministry of Railways is asking for bids for the construction of a branch line to run 20 miles north from Pedegua to connect with a main line.

The construction of the new line from Puerto Bolivar, Ecuador, to Cuenca will begin immediately, according to advices from Guayaquil. The new road will be constructed by a Chilean syndicate and R. Torriblanca, a Chilean engineer, will be in charge of the work.

PROSPECTIVE CONSTRUCTION

Alabama

Montgomery County is to have two new roads, one from Ax's to Calvert in Mobile County, and the other from the Montgomery County line to Tuskege in Macon County.

Several million dollars will be spent for the improving of the road and terminal at Mobile according to I. B. Tigett, President of the Gulf, Mobile and Northern Railroad.

The State Highway Comn., Montgomery, had plans prepared for grading, draining and surfacing 14 mi. Jackson Highway from Axis to Calvert, Mobile Co., gravel, cost $220,000; 20.5 mi. Montgomery-Tuskegee Rd. from Tuskegee to Montgomery Co. line, Macon Co., gravel, $380,000; 12.42 mi. Selma-Mobile Rd., Wilcox Co., gravel, $200,000; 11.18 mi. State Trunk Rd., Montgomery Co., clay gravel, $190,000; 8.02 mi. Hartselle-Cullman Rd., from Morgan Co. line to point 3½ mi. north of Cullman, Cullman Co., bituminous macadam on 2 in. penetration base, $220,000. W. S. Keller, state highway engr.

State Highway Comn., Montgomery, having the plans prepared for grading, draining and surfacing with sand clay on sand base 6.311 mi. of state road, from Butler to Riderwood, Choctaw Co. About $50,000. W. S. Keller, state highway engr.

State Highway Comn., Montgomery, are having the plans prepared for grading, draining and surfacing 20.62 mi. of state road from Monroeville to Little River, Monroe Co., gravel or sand clay. About $160,000. W. S. Keller, state highway engr.

Arizona

Ten miles of roadway connecting Chandler with the Florence road will be built, work to start at once, as announced by Boulevard Supervisor.

California

Work will start in Los Angeles on the Second street tunnel the latter part of December or early in January. As a part of Second street west of Hill street will be wiped out by the tunnel, the city plans to build a forty-foot roadway adjoining the present north line of Second between Hill and Olive streets.

Colorado

Construction of 4.5 mi. of graded road from Lisle and F. Sts., Salida, to the Freemont Co. line has been planned. Plans and specifications on file at the office of the State Highway Comn.

District of Columbia

According to the Interstate Commerce Commission it is planned to spend $6,780,000 for the improvement and additions to the Pennsylvania Railroad Company.

Florida

Comrs. Lake Co. plan election to vote on $625,000 bonds to build 24 mi. road from Mt. Dora to Tavares, Eustis, St. Johns River, Cassia and Sorrento, 16 ft. wide, asphalt and sand clay. E. J. Close, Tavares, engr.

Louisiana

The Fourth District, of the Mississippi River Commission, have several million yards of work which they expect to let at this time; but up to this time they have not awarded any contracts, and indicate that they will take care of this in the forthcoming year.

A great many projects have been held up on account of the conditions of the bond market during the past six or eight months, and if there is an improvement in the market a good many projects will no doubt be started.

Maryland

Co. Comrs. of Washinton Co., have appropriated $2,000 for rebuilding the Broadfording Rd. from the Greencastle Pike to the Broadfording Bridge, Hagerstown.

Massachusetts

The State Highway Dept., Boston, plans to pave state highway from Connecticut State line to Westfield. About $150,000.

Town and Hampden Co. plan to repair 13,791 ft. Southompton Rd. from town line of Westfield to Pond Rd. About $50,000.

Mississippi

Holmes-Yazoo-Humpherys D. D. retained Morgan Eng. Co., engrs., Goodwyn Institute, Memphis, to make surveys for drainage and flood protection system for 120,000 acres, in Holmes, Yazoo and Humphreys Counties.

New Jersey

State Highway Dept., Trenton, plans to expend $70,000 on experimental road building in South Jersey and Perth Amboy.

New Mexico

Plans on file for construction of eleven miles of a Federal Aid road between Valmon and Escondido.

North Carolina

Cypress Creek Twp. plans to sell $40,000 bonds to build 5 mi. road from Louisberg toward Spring Hope, 30 ft. wide, Franklin Co. M. S. Davis, Louisburg, engr.

Ohio

The Village of Garfield Heights plans to grade and built culverts on Orchard St., involving 9,039 cu. yd. grading. H. Bohning, Turney Rd., Cleveland, clk.

Texas

Contract reported signed here for extension of the Wichita Falls & Southern Railroad from Newcasle through Graham and Elliasville, and 10 mi. beyond to connect with the line into Breckenridge. Total of proposed work 42 mi. Frank Kell of Wichita Falls may give information.

Wyoming

Federal Aid program for the coming year includes appropriation of $134,970 for construction of the road between Caspar and Natrona; also $16,000 for the Saratoga-Encampment road.

R. R. Humphreys, Secretary of the East Side Canal Company, wants bids for approximately 49,000 yards of earth excavation and grading.

REVIEW OF BOOKS and CATALOGS

We shall be glad to review, in this column, such books and catalogs as are sent to us. Books reviewed in these columns will be supplied by The Excavating Engineer Publishing Company at the price named.

ECONOMY DEFINED—An illustrated pamphlet 9 x 8, illustrating and describing F. W. D. Trucks from the commercial, practical and economical stand point. *The Four Wheel Drive Auto Co. Clintonville, Wisconsin, and Kitchener, Ontario, Canada.*

THE AUTO CRANE—A well-illustrated catalog, 8½ x 11, 15 pages, describing the various methods of economical handling of coal with this crane. Specifications etc. *The John F. Byers Machine Co., Ravenna, Ohio.*

TRADE NOTES

Blaw-Knox Company, of Blawnox (Pittsburgh) Pa., has established a new sales district in the South, with headquarters in Birmingham, Ala. The Birmingham office is located at 408 American Trust Building. In addition, the Blaw-Knox Company has district offices in New York, Chicago, Detroit, Boston, Baltimore, San Francisco and Sheffield, England.

Prescott V. Kelly, formerly connected with the executive sales department at Pittsburgh, is in charge of the new office. Mr. Kelly will be pleased to answer inquiries concerning any of the following products of the Company: Blaw Clamshell Buckets, and Blaw Steel Forms for concrete construction. Knox Water-cooled equipment for high temperature furnaces, Prudential Sectional Steel Buildings, Quixet Garages, Transmission Towers, Fabricated Steel Products and pressed, riveted and welded steel work of every description.

He (putting up pictures): I can't find a single pin. Where do they all go to, anyway?

She: It's hard to tell, because they're pointed in one direction and headed in another. —*Burr.*

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